Finally, the treatment of tabes is one in which there should be constant supervision. The greatest attention should be devoted to details. Drugs should be used as sparingly as possible. Air, rest, hydrotherapy, and fattening food should be tried, while the physician should adopt a never-failing attitude of hope and encouragement.

TUBERCULIN THERAPY IN SURGICAL TUBERCULOSIS.

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(Concluded from page 270. August, 1912.)

PART V. TUBERCULIN CONTROLLED BY OPSONIC INDEX.

Control by Opsonic Index. Wright[102] (1910) still claims that the opsonic index is of value in diagnosis, and for guidance in dosage in a certain class of cases. On the following pages of the same number of the *Lancet* (page 885) there is recorded a lengthy discussion by Latham, Hewlett, Walters, Warner, and Lawson, and, with the exception of Lawson and Wright, all conclude that a careful observation of clinical symptoms is more valuable than studies of the blood serum for a guide to dosage. Latham[34] and Leishman[103] believe that clinical observation forms a good guide for vaccine therapy.

Management of Dosage. A dose of vaccine followed in twenty-four hours by a rise in temperature, or increase in fluctuation of temperature, or by exacerbation of symptoms, is too large. A dose producing no effect upon the temperature, and no change upon the symptoms, is too small. The proper dose is one which either lowers the temperature or is followed by a diminution in the fluctuation of temperature, and by improvement in the symptoms; and when the effect of the proper dose becomes less, the dose should be increased; but the dose which gives good results should be repeated. These rules apply also to tuberculin therapy.

Inman[98] states that it is essentially an individual treatment. There are three guides: (1) The general condition of the patient; symptoms, physical signs; (2) the temperature curve; (3) investigation of the serum. Each is valuable, but together each is more valuable.

Emery[35] states that the opsonic index affords no clue to the antibodies formed, and that the same benefits may be obtained by simpler methods. Control by the opsonic index, or any other method of serum examination seems unnecessary. Wright's[102] results show that the length of treatment varied from two to thirty-nine months, a variation similar to that recorded by Sahli, Denys, Trudeau, who have controlled cases for years by careful observation of the clinical signs and symptoms. Such variations are so dependent upon the individual response at one time and another, and the opsonic index is so fluctuating in an individual invaded with tubercle (Figs. 5 and 6), as shown by Reyn and Kjer-Petersen,[104] Hastings,[105] and van der Weij,[106] and many others, that injections should be given *regardless of the index*,

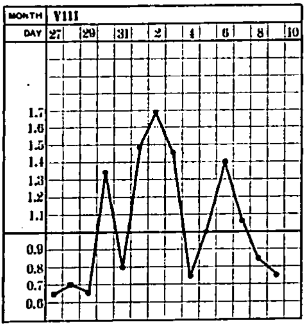

FIG. 5.—Opsonic index to tubercle bacillus. Incipient pulmonary tuberculosis.

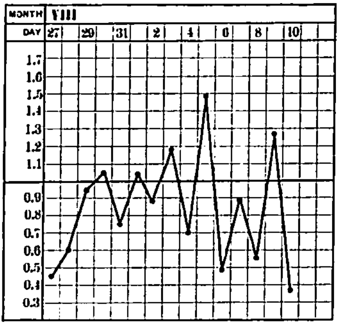

FIG. 6.—Opsonic index to tubercle bacillus. Case of advanced pulmonary tuberculosis.

provided the patient shows immediate tolerance and subsequent improvement (Fig. 7).

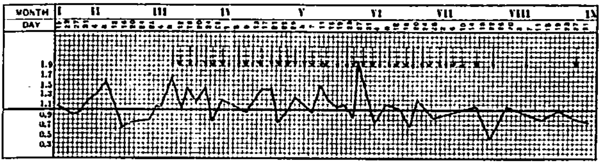

FIG. 7.—Opsonic index to tubercle bacillus. Cervical adenitis, tuberculous.

PART VI. RECORDS OF INOCULATIONS.

The use of tuberculin for surgical cases is of later development than for pulmonary cases. Among the first reports are those of Petruschky[4] (1904), von Hippel,[107] Dörschlag,[108] Nourney,[109] Denys,[12] Heermann,[110] Wright,[58] Bulloch,[111] Kraemer,[112] Walker,[113] Köhler and Lenzmann,[114] and Birnbaum.[115] Wright[58] has recently given a table relating to surgical cases; but his experience does not equal that of Nathan Raw,[116] who is probably handling with tuberculin more cases of tuberculosis, pulmonary, and surgical, than any one other individual, and has had experience with gland, genito-urinary, peritoneal, bone, and pelvic (gynecological) infections.

SURGICAL. One finds scattered throughout the literature on pulmonary invasion isolated instances of a few case reports on surgical conditions (Petruschky, Denys, Klebs, Barney, Pottenger), and a few articles have appeared recently in this country by Hartwell and Streeter,[117] Thomas,[118] Winslow,[119] Peter,[120] Clark,[121] and Pottenger.[122]

This report covers the study in detail of over 174 cases. The cases are grouped according to the anatomical focus invaded as follows: (1) Larynx, 4 cases, 1 death; (2) glands (adenitis), cervical, 43; iliac, 2; 45 cases, 3 deaths; (3) eye and adnexa, 9 cases; (4) tongue (glossal), 1 case (with advanced pulmonary and cervical gland tuberculosis), 1 death; (5) skin (lupus), 3 cases; (6) bones and joints, orthopedic, 65 cases; (7) peritoneum, peritonitis, 5 cases, 2 deaths; (8) intestine, intestinal, 2 cases, 1 death; rectal, 4 cases; (9) adrenal glands, Addison's disease, 5 cases, 5 deaths; (10) genito-urinary tract, 31 cases, 1 death.

A summary of the above shows a total of 174 cases, 13 deaths; 6 cases with pulmonary involvement, 1 renal case with no involvement other than in genito-urinary tract, 5 cases of Addison's disease, and 1 case of general tuberculous adenitis.

LARYNGEAL. Tuberculosis of the larynx is classed, as a rule, under the respiratory and pulmonary invasion, and favorable reports have been made by Jurasz,[123] Pottenger[122] and Winslow.[119] We have recorded 4 "open"* cases, 3 of them complicating some other form of surgical tuberculosis, and improvement has been noted in all lesions in such cases. The total of cases to date treated or now under treatment is 7, and of these 1 only has died. Three cases which have been under treatment less than one year are not included in this report.

GLANDULAR. Results for gland invasion, in a small number of cases, were reported by Petruschky[4] in 1904, and Wright[58] in 1905. Denys,[12] in 1905, recorded and pictured the results of B. F. in the service of Sluyts, who treated 20 cases with tuberculin and by minor surgical methods, resulting in 20 cures which were slow in their course, but without radical operation.

Inoperable adenitis, "open" or "closed," responds readily to injections but a cure may require three years. Our cases are 45, 42 postoperative; 43 cervical, 2 with mediastinal and 2 with axillary involvement; 33 "closed" postoperative; 3 "closed," no operation; 7 "open" postoperative, and 2 inguinal "closed" postoperative.

Of the 43 cervical, 3 were complicated with renal or cystic or other genito-urinary involvement; 5 with pulmonary (2 deaths); 6 with ophthalmic involvement; 1 case died six weeks after cessation of treatment with symptoms of brain tumor and finally, of cerebral hemorrhage. Total deaths, 3.

In 2 cases, only possible recrudescences of the infection were noted, in 1 in the spine and in another possibly in the brain as a solitary tubercle. Abstracts of the histories of these 2 cases are inserted here.

CASE I.—Marjorie K., aged two years. Tuberculous cervical adenitis, two and one-half months duration; suppuration; two operations, with little improvement; temperature variable, usually three days out of the week to 102.5° F. in the late afternoon. Inoculations from February 19, 1910, to September 1, 1910 (six and one-quarter months); 30 inoculations; mixed vaccine, Micrococcus aureus and pneumococcus from May 10 to September 1, 1910 (19 inoculations); reported upon one year after apparent cure; recrudescence of tuberculous disease in spine.

One month after an attack of influenza, November, 1909, in Florence, the cervical glands in the right side began to enlarge. Operated upon in England, December 24, 1909. Profuse suppuration of wound continued and on January 20, a more thorough operation was done on right neck. Two open wounds persisted.

February 18, 1910. Adenoids and tonsils removed. Cultures from cervical wounds sterile.

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* For explanation of terms "open" and "closed" see page 202

Tuberculin injections begun February 19, 1910 (0.1 c.c. of 0.0000001); weight, 30¼ pounds.

March 8. Weight, 28½ pounds. Otitis media left.

March 22. Micrococcus aureus from wound and left ear.

April 8. Nares and ears treated for infection. Conjunctivitis right eye, autogenous Micrococcus aureus vaccine (50,000,000).

April 20. Purulent conjunctivitis both eyes.

April 27. Weight, 29 pounds; temperature to 105° F., and a second acute middle ear infection. In cultures Micrococcus aureus and pneumococcus were found and a mixed vaccine was prepared. Tuberculin had been continued. Wounds healing.

May 15. Fifteenth inoculation (0.4 of 0.000001) of tuberculin. Mixed vaccine 25,000,000 pneumococcus, 75,000,000 Micrococcus aureus. Condition excellent.

May 25. Conjunctivitis recurred in both eyes.

June 11. Tuberculin injections had increased to 0.1 of 0.00001. Weight, 31 pounds. Tuberculin injections continued; vaccine injections discontinued. Patient removed to the country.

September 1. Condition excellent, apparently cured, and injections of tuberculin discontinued.

December 1. No recurrence in the glands and general health excellent. Seven months after last tuberculin injection symptoms of invasion of the spine and two months later Pott's disease well established.

Case II.—Dr. W., aged thirty-eight years. Tuberculous adenitis, cervical, submental, axillary, mediastinal (?). Four years before coming under observation, right and left cervical glands enlarged, following an attack of tonsillitis; radical operations in May, 1906, and October, 1906; several minor operations up to and during 1908; improvement after surgical intervention temporary; hygienic treatment from 1906 to 1908; temperature quite regularly to 101° F. in the late afternoon. Tuberculin inoculations December 16, 1907, to August 19, 1908; from September 21, 1908, to December 14, 1908; from January 30, 1909, to August 17, 1909; from December 15, 1909, to January 30, 1911 (90 inoculations). Tetanus antitoxin August 19, 1908, serum-disease. Autogenous Micrococcus aureus vaccine from March 31, 1908, to May 26, 1908; from November 7, 1908, to August 2, 1909 (47 inoculations), under observation 3½ months after last tuberculin inoculation January 30, 1911; under good hygienic surroundings from 1906 to 1911; death sudden following symptoms of brain tumor May 14, 1911; autopsy not permitted.

In 1903 there developed cervical bilateral adenitis following tonsillitis. Operation May, 1906, in the left posterior triangle and left axilla. Left cervical area was filled with purulent tissue and was curetted. Tubercle bacilli were found. Complete removal was impossible. In October, 1906, submental region left to right and right cervical tissues were removed. "Recurrences" found later when wound dressings were removed, and right axilla was found involved. From June, 1907, to December, 1907, was at Saranac Lake. Previously had been living in Pittsfield, Massachusetts, and now resides there, undergoing the regular tuberculosis cure. Inoculations were begun December 16, 1907 (0.1 c.c. of 0.000001) at three or four day intervals.

January 8, 1908. Right neck opened and curetted.

January 15. Right neck again curetted; no inoculations were given for ten days after operation.

February 14. Marked improvement since January 26, and was given 0.5 c.c. of 0.000001. Slight general reactions followed the inoculations from December 16, 1907, to February 1, 1908.

April 14. Micrococcus aureus was isolated from cervical wound and an autogenous vaccine prepared and 200,000,000 to 400,000,000 given at five-day intervals. Tuberculin continued at three to four-day intervals (0.1 c.c. of 0.000005).

April 26. Marked general reaction after 0.2 c.c. of 0.000005.

July 11. Dosage reached 0.2 c.c. of 0.00001.

August 25. No tuberculin given until September 25, on account of "serum krankheit" following tetanus antitoxin on August 19.

September 21. Inoculations resumed (0.2 c.c. of 0.00001).

December 14. Episcleritis from Micrococcus aureus vaccine. Dosage reached 0.5 c.c. of 0.00001. No tuberculin or vaccine until January 30, 1909.

January 30, 1909. Weight, 160 pounds, a gain of 12 pounds. Wounds in left neck still discharging but much smaller. Inoculation of tuberculin 0.2 c.c. of 0.00001; micrococcus vaccine, 370,000,000.

April 27. Last vaccine April 27. Episcleritis recurred and promptly cleared up after withdrawal of vaccine.

June 20. Tuberculin omitted for two injections on account of possible "hypersensitiveness" (eyes). No improvement in episcleritis noted.

August 2. Vaccine stopped and episcleritis cleared in ten days. Pain in eyes twenty-four hours after Micrococcus aureus vaccine. Tuberculin reached 0.3 c.c. of 0.00005.

August 17. Weight, 166 pounds, a gain of 18 pounds. Tuberculin withdrawn. Sinus nearly closed.

November 19. Weight, 156 pounds. A loss of 10 pounds. Evening rise in temperature during last ten days, and asthenia. No tuberculin since August 17.

December 18. Tuberculin injections (0.1 c.c. of 0.0000001) again begun. Acquired immunity lasted three and one-half months.

December 24. After two tuberculin injections regained energy. Weight, 157 pounds.

1910. From January to March dosage increased to 0.4 c.c. of 0.000001, and gain in weight, 162 pounds, and marked improvement noted.

August 30. Weight, 173½ pounds. After an injection of 0.5 c.c. of 0.00005 a local reaction occurred.

October 10. In excellent health, weight, 175½ pounds, a gain of 27½ pounds. Given 0.8 c.c. of 0.00005 at intervals of ten days. Wound healed. Axillary glands small.

November 20. Given 0.5 c.c. of 0.0001; apparently well. Weight, 182 pounds, a gain of 34 pounds.

Last injection (0.5 c.c. of 0.0001) January 30, 1911. Five months after last injection of tuberculin indefinite symptoms suggesting cerebral involvement. At an interval of one week two attacks with headache, projectile vomiting, then apparent recovery. At the end of fourth week a similar attack with disturbance of vision, with apparent recovery at the end of ten days. No symptoms and general health good for three days then a sudden attack with explosive vomiting, slight headache, beginning optic neuritis, in both eyes (?) and death at the end of twelve hours with symptoms of cerebral hemorrhage (?).

Two full series of injections were given over a period of three and one-half years. The second series included injections of an autogenous Micrococcus aureus vaccine and of tuberculin.

Case III.—Thomas C., aged thirty-seven years. Tuberculous adenitis, cervical, fifteen years' duration. The abstract of a third history is interesting mainly from the fact that recurrence appeared within six weeks from cessation of the tuberculin, and that recovery was complete, though slow, after an operation more radical than the two which had previously been performed.

Four and one-half years ago radical operation, right cervical region; seven months ago radical operation, left cervical region; recurrence in right lower anterior triangle of neck; temperature variable, with slight rise to 101° F. in the late afternoon; no complications, hygienic treatment thorough; advised against third operation. Tuberculin inoculations from April 30, 1907, to December 13, 1907 (34 inoculations).

December 15. A large tender lymph gland noted in the left axilla.

May 28. No tuberculin since May 13, enlarged gland in left axilla persists; no recurrence in the cervical regions.

June 20. Went abroad; operation on both axilla.

Cervical glands on the right side were noted enlarged in 1892; apparently quiescent until the fall of 1902, when they rapidly enlarged and a radical operation was done, the right cervical tissues from the parotid to the clavicle being removed. In October, 1906, the left cervical tissues were removed in the same manner.

April 25, 1907. Recurrence noted in the last few months on the right side, none on the left side; general condition is good; weight, 166 pounds, 11 pounds more than normal. Patient has recently been examined at Saranac Lake; fresh air, limitation of work, and tuberculin advised. Operation advised against by competent surgeons.

April 30. Patient was advised to construct a sleeping shack on the roof. Tuberculin inoculations begun, 0.2 c.c. of 0.000001; inoculations given twice a week, and gradually increased until September 14.

September 21. Inoculations had increased to 0.2 c.c. of 0.0001, interval between inoculations lengthened to one week. For the first time in several months the angle of the right jaw can be felt.

September 28. Following the inoculation of 0.3 c.c. of 0.0001 a moderate general reaction.

October 20. A moderate general reaction following 0.4 c.c. of 0.0001.

October 26. Enlarged gland noted in the left axilla, not tender. Following the reaction on October 20; dosage reduced to 0.3 c.c. of 0.00001.

November 26. Gland in left axilla decreased in size, slightly tender; patient feels much improved.

December 15. Forty-eight hours after 0.5 c.c. of 0.00001, the gland in the left axilla, was more painful and more tender, and the periglandular tissues considerably swollen; no constitutional symptoms; loss in weight of 13 pounds.

December 22. General condition much improved; patient has received no tuberculin since December 13; axillary glands much swollen. The pain and tenderness in the left side explained by the sudden appearance of a well-distributed herpes zoster.

May 28, 1908. The glands in the left axilla are still enlarged. No recurrence in the neck, and no tuberculin since December 13, 1907.

June 20. The patient went to Europe.

October. Temperature returned, and he was ill before landing on the Continent (axillary glands). Went to Austrian Tyrol, and there was in the hands of a sanitarium expert, who advised treatment with Beraneck's tuberculin. Did not accept advice, but went to Kocher, in Bern, who performed a most radical operation in the axillary region; febrile illness lasted several weeks; able to return home in the late summer, and has continued the out-door treatment and roof sleeping.

EYE AND ITS ADNEXA. For tuberculosis of the eye and its adnexa, tuberculin was used by von Hippel[107] and by Dörschlag[108] prior to 1905. An excellent experimental study of such cases was made by Daels[27] in 1907, and articles dealing with the clinical results have come from Snell,[124] Brueckner,[125] Bull,[126] Darier,[127] Dor,[128] Derby,[129] and Herrenschwand,[130] all of whom agree as to the beneficial results from tuberculin.

SUMMARY.—Of our 9 "closed" cases, the outcome is unknown in 3, the process was arrested in 1, and 5 were cured.

TUBERCULOSIS OF THE TONGUE. We have treated one "open" case, which was complicated with the presence of pulmonary invasion, and involvement of the cervical glands. Death occurred from pulmonary hemorrhage. The condition of the tongue was markedly improved after three months' treatment.

SKIN TUBERCULOSIS, INCLUDING LUPUS. Nourney[109] (1905) and Heermann[110] (1905) reported at the Verein der Aerzte, of Duesseldorf (in 1905), the treatment of a few cases of lupus, with satisfactory results. Denys[12] states that all lupus cases are benefitted, and a few are completely cured with B. F., and emphasizes the necessity for considering carefully the specific treatment of the secondary streptococcus infections. Wright,[58] Raw,[37] Tod and Western,[131] and Rosenbach,[132] report good results.

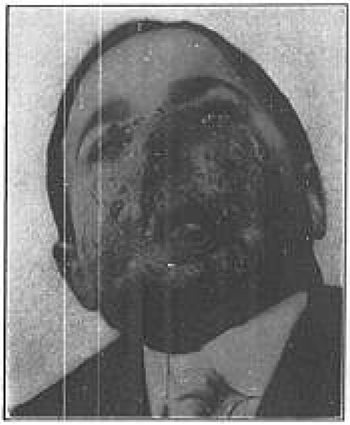

FIG. 8.—Lupus, after six months' treatment with B. E. and autogenous vaccine.

The Finnish, Dutch, and Danish reports are not in accord, and are mainly against those of the other observers.

Our cases total 3 "open" and for these the results may be expressed as poor (see Figs. 8, 9 and 10). The 2 cases photographed were also treated with Micrococcus aureus and streptococcus vaccines (autogenous).

ORTHOPEDIC. Bone and Joints. Denys[12] records 6 cases of bone tuberculosis treated by Sluyts and von der Bergh, with or without minor operations as seemed necessary, who considered the cases rapidly cured.

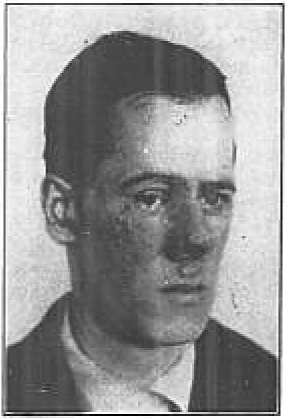

FIG. 9.—Lupus. At beginning of treatment.

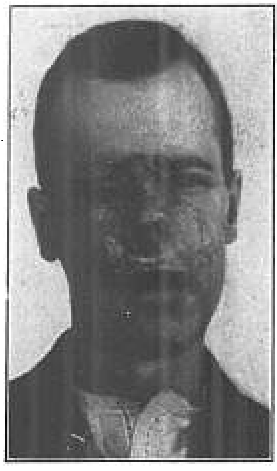

FIG. 10.—After six months' treatment.

The secondary streptococcus invasion was found an extremely important factor and, as is well known, retarded healing.

Ridlon[133] (1908) reported on chronic joint cases and Nutt and Hastings[134] after experience with 24 cases of bone and joint infections concluded that tuberculin is of decided value in the treatment of tuberculous joints and bones. It seems the best tonic we have for such patients and has also an effect on the local infection, which cannot be wholly accounted for by improvement in general health. This conclusion remains unchanged after careful study of 65 cases. These cases were "open," with sinuses.

Peritonitis, Tuberculous. Denys[12] reported 8 cases in 1902, and 8 additional in 1905. Of the 16 cases, 13 were classed as cured, and of the 3 deaths 1 was from acute pneumonitis. Birnbaum[115] reported (1907) 11 cases; 5 with, and 6 without ascites, and Nathan Raw[116] (1910) reported 19 cures out of 26 cases.

Summary of our cases: Five "closed" cases; results good in 3, death in 2.

The report of the following case is of interest on account of the complications, the continuance of tuberculin inoculations during the febrile period (see Fig. 3), and the single course of tuberculin.

Case IV.—Nanette T., aged seven years. Tuberculous peritonitis, bilateral pleuritis, bronchopneumonia. Peritonitis noted in November, 1909. Operation in December, 1909; failing since operation; hygienic treatment in the city; irregularly intermittent temperature with wide variations to 104° F., pulse 120 to 140 (see Fig. 3). Respiration, 30 to 40. Tuberculin inoculations begun February 1, 1910, and continued until July 10, 1910 (27 inoculations, from 0.1 c.c. of 0.0000001 to 0.6 c.c. of 0.00001); hygienic conditions good; in New York until May, then in the country; apparently cured in August; health excellent in December, 1910; no recurrence or recrudescence in October, 1911.

December, 1909. Operation.

January 31, 1910. Has been failing since operation. Temperature irregularly intermittent, with wide variations to 104° F.; pulse from 120 to 140; respirations from 30 to 40 a minute.

February 1. First tuberculin inoculation, 0.1 c.c. of 0.0000001; inoculations to be given at intervals of four or five days.

February 12. Right pleuritis, with effusion; heart 5 inches to left of midsternal line.

February 17. Dulness lessened over right back; heart 3½ inches to the left of midsternal line.

March 20. During last ten days bronchopneumonia and pleurisy signs over left axilla and left back below spine of scapula.

April 1. Improvement marked; temperature, 100° to 101° F. in afternoon.

April 4. Inoculation of 0.1 c.c. of 0.000001, and following it a general reaction with temperature to 103° F. Inoculations continued regardless of temperature, since no signs of local reaction over abdomen were evident.

May 20. General health and local condition excellent. Patient moved to the country.

July 10. Last tuberculin inoculation given (0.6 c.c. of 0.00001).

December 1. Health excellent, remains well. Weight, increased from 48½ pounds to 62½ pounds, partially accounted for by growth.

INTESTINAL. Seven cases were recorded by Denys[12] in 1905. Of these 3 were febrile, and 1 recovered and 2 died. Of the 4 afebrile cases there are 4 cures. We record 2 "open" cases, with 1 death; 1 intestinal, sigmoiditis death; 1 intestinal, upper colon (?), mesenteric glands involved.

In addition, the 4 following cases were treated with marked improvement in general health and ultimately apparent cure; 3 fistula in ano, 1 perineal tissues and rectum.

ADRENAL TUBERCULOSIS (ADDISON'S DISEASE). Treated 5 "closed" cases. No improvement has been noted under tuberculin therapy. The 5 cases died.

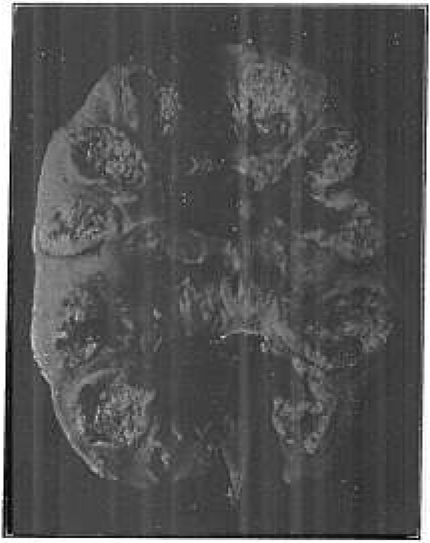

FIG. 11.—After tuberculin inoculations. (Ekehorn, Type i.)

GENITO-URINARY. In 1907, Birnbaum[115] reported excellent results in 4 cases of cystitis, 1 with renal involvement.

Denys[12] (1905) alluded to the excellent results to be expected, and records 1 case of cystitis in a young woman cured after injections from March, 1902, to July, 1905.

Wildbolz,[135] Fullerton,[136] Pottenger,[137] Nathan Raw,[116] Young,[138] Gardner,[139] Walker,[140] report cases, and the general conclusion seems to be that benefit accrues from the increase of the general toxin tolerance. Wildbolz could find in 5 tuberculous kidneys little evidence of scaring.

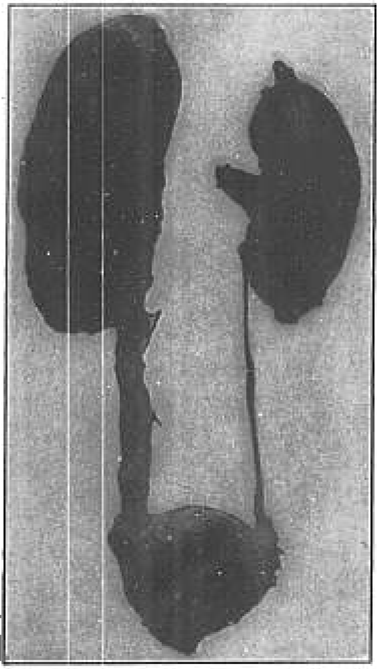

Fig. 12.—Kidney not opened. No tuberculin. No operation. Under observation two years. before death.

Ekehorn[141] recently published an interesting article bearing on the general pathology of renal tuberculosis. It is quoted in detail, for the photographs (Figs. 11, 12 and 13) of 2 of our specimens show his types of lesion. He studied in 33 cases the spontaneous course of the disease, without treatment; 25 died. Of the eight still living, in whom diagnosis was made eight years ago, on an average, 4 were subjectively healthy, and at times passed a clear urine; but healing was only apparent. In 4 others he states "the process is now rapid and the course will probably be short."

In histological specimens, from section, or late operation, there are two general types of lesion: (1) Kidney changed to cavernous pockets, corresponding to calices, filled with sterile detritus, and parenchyma about all lost (late). (2) The second group is one with a sclerosing process, which involves kidney and surrounding tissue. At times only a part, as that of the upper third, is involved. Ekehorn concludes that secondary infection from the renal pelvis always follows rupture of the original focus, while the original tubercle-bacillus infection is from the blood.

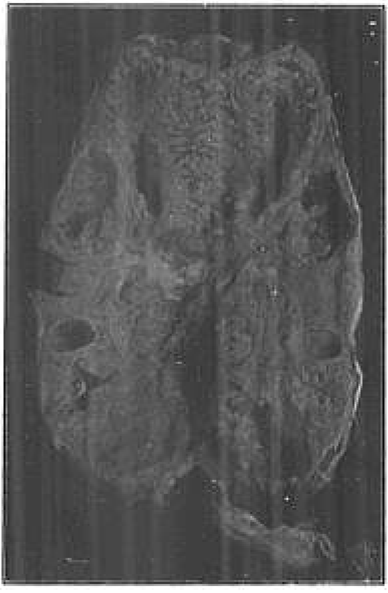

FIG. 13.—Kidney opened. (Ekehorn, Type ii.)

Since spontaneous healing is a rare exception, nephrectomy is indicated after diagnosis is established. The use of tuberculin is not considered.

SUMMARY OF GENITO-URINARY CASES. With renal involvement: Fifteen "open" cases, with 1 death.

Without renal involvement: Sixteen "open" cases, no deaths. Total of 31 cases, with 1 death. Of 3 untreated cases 2 died, 1 was living in 1910. Thirty-four cases in all were observed over a period of four years with 3 deaths, and a majority of them have improved to such a degree that it is safe to say that at the end of eight years, a period corresponding to that of Ekehorn's observations, a much larger percentage will have survived than noted by Ekehorn for cases running a spontaneous course without treatment. Of the 31 cases treated with tuberculin 22 were considered inoperable, 4 were operated upon after the general health was much improved under tuberculin, and 5 were treated with tuberculin after operation.

In 1 case, a patient, aged sixty years, renal tuberculosis in the left kidney was apparently cured by one series of inoculations over a period of seven months, without operation. The infection in the left kidney was proved by ureteral catheterization.

The abstracts of 3 case histories are appended.

Case V.—Dr. R. W., aged 42 years. Tuberculosis of right kidney, bladder, prostate, and seminal vesicles. Duration 2 years; inoperable. No hygienic treatment, irregular evening temperature. Tuberculin injections from July 30, 1907, to May 9, 1908 (60 inoculations); improvement. Death two months after withdrawing inoculations.

Tuberculin given in two series: First series, dosage up to 0.5 c.c. of 0.0001; second series, dosage up to 1 c.c. of 0.00002.

Case VI.—Dr. I. D. K., aged twenty-eight years. Tuberculosis of the kidney and bladder, duration two years.

Tuberculin inoculations from May 21, 1908, to September 22, 1909, and from October 2, 1909, to February 3, 1910 (80 inoculations).

February 19, 1910. Pyelitis. Secondary infection. Nephrectomy.

December, 1911. Occasional attacks of frequency of urination. Urine normal and free from tubercle bacilli.

Tuberculosis of the left kidney and bladder was diagnosticated six months before patient was admitted for tuberculin inoculations. The general health was excellent, and the only symptom complained of was frequent micturition for which the patient consulted a specialist, who through cystoscopic examination discovered the tuberculous condition of the kidney and bladder. The urine contained a relatively small number of pus cells and red blood cells, and a large number of tubercle bacilli. Nephrectomy was advised but the patient refused to have operation, and went to Saranac Lake where he remained for six months, during which time inoculations of tuberculin were administered.

May 21, 1908. The first inoculation of first series was given, dosage 0.1 c.c. of 0.000001 B. E.

May 25. Tubercle bacilli demonstrated in the urine.

August 8. Within twenty-four hours after tuberculin inoculation frequency of urine was increased.

August 28. Following tuberculin inoculation on August 22, temperature rose to 101° F., and a general reaction occurred, which lasted two days; one tuberculin inoculation was omitted. Frequency of urination was increased for twelve hours following the inoculation, then suddenly ceased; since August 25; patient states that he never felt better.

September 1. Reported that he was not feeling so well, on account of slight headache and night sweats during the two preceding nights.

September 12. Frequency of urination marked, so that dosage of tuberculin was not increased.

October 3. Frequency of urination diminished, probably in consequence of a few doses of tincture of hyoscyamus.

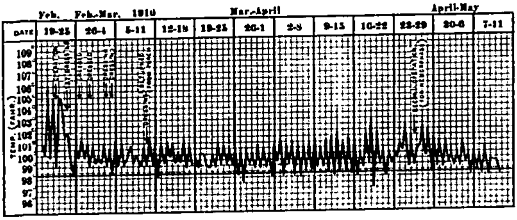

Fig. 14.—Secondary renal infection in renal tuberculosis. Operation.

October 26. After the last 3 inoculations there has been a distinct local reaction, as indicated by the increased frequency of urination; slight hematuria; and pain in the bladder lasting twenty-four hours.

December 11. Frequency of urination much less; feels much better in every way.

December 21. Increased frequency and discomfort again noted after the last dose.

June 28, 1909. Following the inoculation of 0.8 c.c. of 0.0001 on June 18 the temperature rose to 102° F. and lasted for four hours, since when the patient is much improved; the dose reduced to 0.5 c.c. of 0.0001. Since reaching 0.5 c.c. of 0.00001 the inoculations have been given at ten-day intervals.

July 19. Following the inoculation of July 9, 0.5 c.c. of 0.0001 the temperature again arose for a few hours; the dose was reduced to 0.3 c.c. of 0.0001.

Showed a marked increase in weight and improvement in general condition until the sudden rise of temperature and septic symptoms, which occurred in February, 1910.

February 19, 1910. Patient's temperature suddenly rose from 101° to 105.5° F., and the symptoms and signs of acute septic condition rapidly developed. An operation was immediately performed; the left kidney was removed, and two days following the operation the temperature had again fallen to its former course, that of a remittent temperature from 99° to 101° F.

April 23. Two months after operation, without warning, a severe hemorrhage from the wound occurred, and a second operation was performed, following which the patient was in a precarious condition for ten days.

May 11. Marked improvement was noted; the temperature varies from 98° to 99.5° F., and shortly became normal.

July. Went to Saranac Lake; was given few doses of tuberculin; remained there until early in September.

December 4, 1911. Patient reported in excellent health, excepting an occasional attack of frequent micturition lasting a few hours. Urine normal, tubercle bacilli not found.

Case VII.—Mr. W., aged 47 years. Tuberculosis of both (?) kidneys, prostate, bladder, and cervical glands; eighteen months (?) duration; inoperable; irregular evening temperature; hygienic surroundings favorable. Tuberculin inoculations from March 9, 1908, to September 17, 1909; dosage 0.2 c.c. of 0.0005; second series, October 7, 1909, to November 2, 1910, dosage to 0.6 c.c. of 0.0001; third series, December 9, 1910, to November, 1911. The general condition is good, gain of 42 pounds in weight is maintained; no tubercle bacilli in the urine.

Was referred by the late Dr. Alexander, in March, 1908. Examination by Dr. Alexander revealed the involvement of both ureteral orifices, the trigonum and extending into the fundus; the process was more extensive on the right side. It was considered that both kidneys were involved, although tenderness with some enlargement was noted only on the right side. The patient had been under treatment for chronic cystitis for over two years, the condition had not improved. There had been a loss of weight of 32 pounds and the patient suffered mostly from severe pain in the pelvis which was referred to the bladder and to the rectum; frequent micturition disturbed rest and sleep, while the pain was controlled by codeine and morphine. Urination occurred at least every hour during the late afternoon, after slight exercise as often as every twenty minutes. The urine was thick with pus and blood and showed a large number of tubercle bacilli. The cervical glands on one side of the neck were enlarged and quite firm, forming a mass extending from the tip of the mastoid to the clavicle on the right side. The local treatment, irrigations with silver nitrate and other drugs, was continued.

Proper hygienic measures were advised—living and sleeping in the open air, suralimentation and rest.

Operation was absolutely contraindicated. Tuberculin inoculations were begun March 9, 1908, with 0.1 c.c. of 0.000001.

July 23, 1908. The general health was much improved; patient complains of severe pain at the neck of the bladder and frequent micturation; on cystoscopic examination no local retrogression noted.

September 9. Bladder irrigations with 1 per cent. silver nitrate have been continued, and following this irrigation there has been severe pain and suppression of urine; dosage of tuberculin more rapidly increased.

December 28. During the last ten days patient suffered from attack of acute rheumatic arthritis; was given large doses of aspirin, which increased the irritation of the bladder; tuberculin inoculations 0.3 c.c. of 0.0001.

March 23, 1909. Cystoscopic examination, pus coming from right ureter, left ureteral orifice normal; the bladder about the trigonum appears normal, prostate only slightly involved.

March 26. On account of persistence of pain and frequent micturition, cultures were taken from the urine which still contained large numbers of tubercle bacilli, and streptococcus was obtained in pure culture. A vaccine was prepared and was inoculated with the tuberculin; following this there was a marked focal reaction in the prostate, with pain, swelling and tenderness which persisted for five days.

April 21. Again an inoculation of streptococcus vaccine was given, 41,000,000; no reaction.

April 27. An inoculation of streptococcus vaccine, 30,000,000 and 0.5 c.c. of 0.0001 of tuberculin was given.

May 18. Forty-eight hours after last dose (May 11) there was a slight focal reaction in the prostate and bladder, so that the dose of streptococcus vaccine was decreased to 27,000,000; the tuberculin was not increased.

June 2. The streptococcus vaccine discontinued; marked improvement in the sensitiveness of the trigonum and in the frequency of micturition, which followed the first three doses of streptococcus vaccine.

June 21. Since withdrawal of the streptococcus vaccine (June 2) pain in the bladder, burning micturition and the frequency have increased markedly. Fresh streptococcus vaccine was prepared, which was not used until August 9, for it was considered that the symptoms depended solely on the tuberculous process.

September 17. The vaccine and tuberculin have been continued since August 9. Tuberculin and vaccine now discontinued for three weeks; the symptoms seemed intensified so definitely following the injection of tuberculin that it was decided to return to small doses after three weeks.

October 7. Tuberculin inoculations resumed, with a dose of 0.1 c.c. of 0.000005.

October 16. Since September 17 (during the time he was receiving no tuberculin or vaccine) symptoms were aggravated and rest and sleep were disturbed on account of frequent micturition which occurred as often as fifty (?) times in one night.

November 9. The dosage of tuberculin has been very slowly increased, resulting in less improvement in his symptoms; for short periods of from two to three hours during the day the urine was voided every ten minutes, and such an attack was followed by intense burning pain in the bladder, which lasted throughout the rest of the day. Intense pain in the bladder occurs also after defecation; a few small clots of blood have been passed in the stools; examination revealed the presence of hemorrhoids; the urine no longer contains blood macroscopically, but is filled with mucus and pus; there has been no fever for the last few weeks but the sweating continues.

December 7. Dr. Alexander refused to make a cystoscopic examination, on the ground that his general condition was excellent, and that both kidneys were originally involved, and since the bladder symptoms were better he would not make a cystoscopic examination. Since his symptoms had not ameliorated during the last eight weeks, on December 1, the dosage of tuberculin was reduced to 0.1 c.c. of 0.000001.

May 16, 1910. General condition excellent; weight, 142 pounds, a gain of 32 pounds; feels well, but still complains of, for him, a moderate frequency of micturition. Reported to Dr. Alexander who advised him to persist with the tuberculin therapy.

October 25. Dosage of tuberculin inoculation 0.5 c.c. of 0.0001; during the last week, has complained of frequent micturition, for the first time in months. The urine is cloudy, contains a few small granular masses consisting of leukocytes; tubercle bacilli could not be demonstrated; the method of demonstrating the tubercle bacilli was the same as for the previous examinations made since March, 1908. A careful search was made of the stained specimen of pus after centrifugation, and the pus was also inoculated into guinea-pigs; later on, the antiformin method was employed.

November 2. Dosage of tuberculin 0.6 c.c. of 0.0001; has complained again, during last week, of frequent micturition and of burning on micturition, and also of a dull heavy ache which radiates down to the pubes. The tuberculin discontinued for six weeks, at the end of which time a third series of 0.2 c.c. of 0.000001 was advised.

November 30. Symptoms have improved; short attacks of painful urination occur but seldom; his weight is above his former usual weight of 130 pounds; for some months he has been able to attend to work which calls for little exertion.

December 9. Third series of tuberculin inoculations begun with 0.2 c.c. of 0.000001.

January 19, 1911. Since last visit has gained 7 pounds in weight; feels much stronger than he has felt in years; no dysuria and no frequent micturition; the urine is practically clear and contains no tubercle bacilli. The patient has been returning very irregularly for tuberculin inoculations because he feels so well, and has received no tuberculin inoculation since December 9, six weeks ago.

March 1. Still gaining in weight; feels stronger; during the last few weeks dysuria has not returned.

May 9. Dosage of tuberculin inoculation 0.5 c.c. of 0.000001; weight, 143 pounds; frequency of micturition slightly increased during the last few weeks.

July 26. The patient has returned for tuberculin inoculations at intervals of six or seven weeks; inoculation of 0.5 c.c. of 0.000001, and was advised to discontinue the inoculation unless he could return more frequently.

October 23. Complains that he has not felt so well for a week, although the local symptoms of his tuberculous disease have abated. The urine is free from tubercle bacilli and shows only a few leukocytes; tuberculin inoculations have been discontinued.

December 2. Tuberculin injections begun again, 0.1 c.c. of 0.000001. General health excellent; frequent micturition occasionally occurs and lasts for a few hours; urine free from tubercle bacilli.

TUBES AND PELVIC ORGANS (GYNECOLOGICAL). Such cases have been reported upon favorably by Birnbaum[115] (1907), and by Nathan Raw[116] (in 1910). We have had no experience with such cases.

MILIARY TUBERCULOSIS. One may quote Denys:[12] "The process is too rapid to be influenced by B. F.," and one may add by any other kind of tuberculin. The specific therapy for miliary disease will, if it comes, not be a process of active immunization but one of passive immunization, with some particular serum or chemotherapy.

CONCLUSION.

SECONDARY INFECTION MODIFIES. From the nature of the process of active immunization one should expect the results with tuberculin in surgical tuberculosis to be much the same with all anatomical types, and such is the fact. The one modifying factor, aside from that of the individual's response is that of secondary infection, and one may state that "closed" cases, in the sense of Petruschky, do well; and often cases vary according to the summation of toxic effects from the tubercle bacillus and the secondary invaders.

In surgical conditions the secondary invader is not so to be feared as in the pulmonary and pleural conditions, and the secondary invasions in surgical conditions always call for some other than tuberculin treatment. We may again recall the patience and perseverance exemplified by Petruschky in dealing with such cases and conclude with him that in Koch's tuberculin we have a valuable agent for treating incipient tuberculosis; and may add that until specific therapy has been tried one should never despair of a seemingly hopeless case.

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